

DETERGENCY BUILDER SYSTEM

This application is a continuation-in-part of co-pending U.S. patent application Ser. No. 754,561, filed July 11, 1985, which is in turn a continuation-in-part of abandoned U.S. patent application Ser. No. 702,521, filed Feb. 19, 1985.

TECHNICAL FIELD

The present invention relates to detergency builder systems useful in detergent compositions.

BACKGROUND ART

The term detergency builder can be applied to any component of a detergent composition which increases the detergent power of a surface active agent, hereinafter surfactant. Generally recognized functions of detergency builders include removal of alkaline earth, e.g., calcium, and other undesirable metal ions from washing solutions by sequestration or precipitation, providing alkalinity and buffer capacity, prevention of flocculation, maintenance of ionic strength, protection of anionic surfactants from precipitation, extraction of metals from soils as an aid to their removal, soil suspension, and peptization and dispersion of soil. Polyphosphates such as tripolyphosphates and pyrophosphates are widely used as ingredients in detergent compositions and are highly effective detergency builders. However, the effect of phosphorus on eutrophication of lakes and streams has been questioned and the use of phosphates in detergent compositions has been subject to government regulation or prohibition.

These circumstances have developed a need for highly effective and efficient phosphorus-free detergency builders. Many materials and combinations of materials have been used or proposed as detergency builders. Carbonates and silicates are widely used in granular detergent compositions, but by themselves are deficient as detergency builders in a number of respects. Aluminosilicates such as described in U.S. Pat. No. 4,274,975, issued June 23, 1981, to Corkill et al., have also been used to replace polyphosphates. Aluminosilicates, however, have relatively low calcium and magnesium binding constants and can present solubility problems, particularly in combination with silicates.

Very useful phosphorus-free detergent builder materials have been found to include the ether polycarboxylates. A number of ether carboxylate types have, in fact, been disclosed in the art for use as detergent builders. Many, but not all, ether carboxylates are deficient in calcium binding power relative to inorganic polyphosphates. Some ether carboxylates, however, such as oxydisuccinate as disclosed in Berg; U.S. Pat. No. 3,128,287; issued Apr. 7, 1964 and Lamberti et al; U.S. Pat. No. 3,635,830; issued Jan. 18, 1972, are quite effective in binding hardness ions such as calcium. These selected ether carboxylates can therefore be utilized in detergent builder systems which are as effective as conventional phosphorus-type builders in enhancing cleaning performance of detergent products containing them.

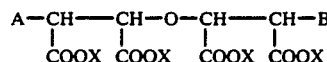
Even though certain ether carboxylate compounds can be as effective in builder performance as phosphate materials, ether carboxylates tend to be relatively expensive materials. Accordingly, it would be desirable to formulate ether carboxylate-containing detergent compositions which provide builder performance that is superior to that of conventional phosphate builders.

Such improved builder systems could then be utilized in somewhat lower concentrations in detergent products or could be employed in detergent products which are superior in cleaning performance to conventional phosphate-containing formulations.

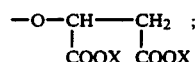
In view of the foregoing, it is an object of the present invention to provide ether carboxylate-containing builder compositions which, as a system, provide better builder performance than do conventional phosphate materials such as sodium tripolyphosphate. It is a further object of the present invention to provide improved detergent and laundry additive compositions employing such ether carboxylate-containing builder systems.

SUMMARY OF THE INVENTION

The present invention provides detergent builder compositions which comprise (a) from about 70% to 99% by weight of an ether carboxylate sequestering agent having the general formula:



wherein A is H or OH; B is H or



and X is H or a salt-forming cation; and (b) from about 1% to 30% by weight of a particular type of dispersing/anti-redeposition agent. This dispersing/anti-redeposition agent can comprise either a certain type of polycarboxylate material defined in greater detail hereinafter (e.g., polyacrylates or acrylate/maleate copolymers) or can comprise certain types of ethoxylated amine compounds also defined in greater detail hereinafter (e.g., ethoxylated polyethyleneamines and ethoxylated polyethyleneimines). Combinations of such polycarboxylates and ethoxylated amines may also be employed as the dispersing/anti-redeposition agent. The weight ratio of ether carboxylate to dispersing/anti-redeposition agent in such builder compositions ranges from about 99:1 to 70:30.

The present invention also provides detergent and laundry additive compositions containing the two-component, ether carboxylate-based builder systems herein.

DETAILED DESCRIPTION OF THE INVENTION

One essential component of the detergent builder compositions herein is a particular type of ether carboxylate sequestering agent having the general formula hereinbefore set forth. Compounds falling within this general structure bind water-hardness ions such as calcium in aqueous solutions, e.g., a laundry washing solution, by forming polydentate structures therewith.

One type of operable ether carboxylate useful in the present invention is that wherein in the above general formula A and B are both H. Such a material comprises oxydisuccinic acid and its water-soluble salts. Oxydisuccinic acid and salts thereof have the general formula: